

3 March 2005

Mr. Alan Goodman
Remediation Project Manager
U.S. Environmental Protection Agency, Region 10
1200 Sixth Avenue
Seattle, WA 98101

Subject: Comments on Dr. Wayne Berman's 18 February 2005
North Ridge Estates Preliminary Evaluation Report
K/J 036409.03

Dear Mr. Goodman:

This letter provides Kennedy/Jenks Consultants' initial comments on the *Preliminary Evaluation of the Implications of Airborne Asbestos Exposure Concentrations Observed During Simulation of a Selected Set of Common, Outdoor Residential Activities Conducted at the North Ridge Estates Site, Klamath Falls, Oregon* prepared by D. Wayne Berman, Ph.D. Dr. Berman's report compares the results of U.S. Environmental Protection Agency's (EPA) activity based sampling study conducted at North Ridge Estates (NRE) with his previous modeling efforts, and provides his assessment of the risks associated with the activities. We have many concerns about the assumptions and conclusions presented in this report, and look forward to EPA's independent evaluation of Dr. Berman's report.

Berman's report, received 18 February 2005, attempts to reconcile the direct measured airborne asbestos concentrations measured by EPA during activity based sampling with his previous modeled estimates of exposure and risk presented in his *Soil Sampling Results and Preliminary Risk Assessment for the North Ridge Estates Site, Final Draft*, dated 6 July 2004. We are disappointed that Dr. Berman's latest report took so long to be distributed to NRE residents considering Dr. Berman's recommendations to curtail certain activities based on the new risk information derived from the activity based sampling.

As these latest results demonstrate, the adverse health risks to NRE residents from on-going asbestos exposures are real, and likely greater than estimated by Dr. Berman's methods.

Kennedy/Jenks Consultants has concerns about how the data was used in both these reports. For instance, Dr. Berman applies site-wide average asbestos concentrations to his risk assessment. With every new study, it is more apparent that the risk to individuals should be assessed on a property by property basis because of the heterogeneity of the distribution of asbestos at NRE. The discrepancies between Dr. Berman's predicted fiber exposure estimates and what was actually measured indicate the uncertainty of Dr. Berman's modeling efforts and the variability of exposure risk throughout NRE. In some cases, refinements to Dr. Berman's initial estimates resulted in increasing the risk estimates for some activities by approximately 1,000 times.

Additionally, the fact that Dr. Berman made adjustments to his model based on the activity based sampling data proves that his methods are a work in progress that should not be relied upon for making decisions about risk to residents at NRE. The details of Dr. Berman's method must be thoroughly reviewed through independent peer review and testing before being applied to real life situations. NRE residents should not be the "guinea pigs" for testing Dr. Berman's unproven methods. Moreover, as discussed below, it is premature to make judgments about risk at NRE because the properties have not yet been adequately characterized.

Our specific concerns about Dr. Berman's latest report include:

- *Dr. Berman's use of site-wide average soil data to model some activities is inappropriate because many of the modeled activities take place on individual properties that may have much higher asbestos concentrations.* Dr. Berman's approach applies site-wide asbestos in soil concentrations to some task-specific activities such as rototilling which, in fact, typically take place in localized areas. The appropriate area of risk evaluation for residential properties is each individual property because it better represents exposure to individual residents.

In fact, in the activity based sampling report, Dr. Berman ignores a sample that contained amosite asbestos from his risk evaluation because it "was likely collected from a location where steam pipe originally entered the house" and therefore, in his opinion, the sample "clearly does not represent general or typical conditions at the site." On the contrary, the resident rototilling in that specific area would in fact be exposed to higher risk amosite asbestos. We cannot know how many amosite hot spots are actually present at NRE until a full soil sampling assessment is conducted; however, observations of newly exposed amosite containing pipe insulation that prompted the 2004 emergency removal actions suggests that the problem is more widespread than Dr. Berman's previous limited random soil sampling effort indicates. The site must be fully evaluated before conclusions about risk at the site can be made.

- *Dr. Berman's assumption that data from EPA one round of activity based sampling represents worst-case conditions is erroneous.* Berman assumes that the EPA simulated work practices measurement represent worst-case conditions. However, the measurements were made in just one area, which, while visibly contaminated with surface asbestos containing material, may not represent the worst areas of contamination at NRE. This area was selected by EPA because of its distance from other residents (to limit exposure to residents), accessibility, and MBK ownership, as well as because of the visible contamination. Visual observations and other sampling by EPA indicate that there are many areas of concern at NRE, some of which may have higher concentrations of amphibole type asbestos. Without conducting soil sampling throughout NRE, we cannot conclude that this is the worst-case area at NRE.
- *While Dr. Berman claims that his risk numbers are acceptable, he provides contradictory recommendations to curtail activities such as child playing and gardening at NRE.* This is apparently due to the lack of certainty and paucity of actual site data needed to make an accurate assessment of risk on individual properties.

- *Dr. Berman does not address the fact that direct measurements of generated dust are much higher than what he originally modeled.* Dr. Berman dismisses the EPA dust measurements because the dust monitor was worn at waist height rather than at the breathing zone (approximately 2 feet lower). However, this slight difference between breathing zones cannot account for the fact that dust measurements for child's play were several orders of magnitude (100 to 10,000 times) higher than the factors used in Dr. Berman's model. In fact, in Dr. Berman's original method, he uses a 0.5 meter height for the child play estimates. Higher dust emission factors would increase Dr. Berman's modeled estimates of asbestos exposure and attendant risk.
- *Dr. Berman's risk values do not represent the upper bounds of risk at NRE because he does not use the most conservative values in his estimates to account for uncertainties.* In his report, Dr. Berman repeatedly states that his revised model results represent upper bounds of risk at NRE, whereas with new information, the risk estimates are increasing (becoming worse). The use of "worst-case" exposure parameters is generally required by EPA in the risk estimate screening of sites where there is a potential risk from exposure to contaminated chemicals or materials. These worst-case conditions can be refined as more site information becomes available, but we currently do not have this information. Dr. Berman was not exceptionally conservative in this approach; on the contrary, using very conservative values is the typical approach for any risk assessment process at this stage of understanding. Better characterization of the conditions at NRE will not likely minimize or reduce these exposure/media parameters as the heterogeneity of soil contamination can only further illustrate the high degree of uncertainty about possible asbestos exposure and subsequently, the high uncertainty in risk estimates that result.
- *Dr. Berman's estimates of task based risk are inappropriate.* The task based risk values proposed by Dr. Berman do not address the cumulative effects of repeated activities or other sources of exposures. These risk estimates do not account for total risk associated with residing at NRE, nor do they take into account historical accumulative exposures. Assessment of risk to NRE residents must account for the cumulative effects of all routes of exposure over the lifetime of the residents. Risk decisions at the site should be exceptionally conservative because of the uncertainty about real but unquantifiable historical exposures to NRE residents. Furthermore, the risk estimates do not address the on-going degradation of asbestos-containing material at NRE, which will increase fiber release rates over time.
- *Dr. Berman's assessment ignores Oregon's acceptable risk level of 10^{-6} in his evaluation of his risk estimates.* Dr. Berman cites 10^{-4} risk levels as being "potentially acceptable" to EPA and states that his estimates are at or below this risk level. However, DEQ uses "a lifetime excess cancer risk of less than or equal to one per one million for an individual" or 10^{-6} as Oregon's carcinogenic risk criterion as stated in OAR 340-122-115(2)(a). Hence, the 10^{-6} criterion is the Appropriate Relevant Applicable Requirement for risk estimation at NRE.

In conclusion, EPA's activity based sampling illuminates the unreliability and high variability of Berman's experimental theoretical modeling efforts. This warrants the need for a thorough investigation of the distribution and types of asbestos in each residential property at NRE. We trust that EPA will provide an independent assessment of risk at NRE, including an honest

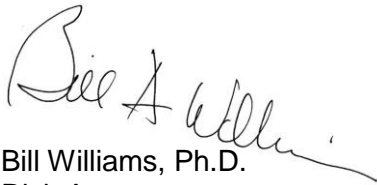
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appraisal of the uncertainties of our current understanding of risk, at the upcoming public meeting on NRE in March 2005.

Please feel free to contact us at (503) 295-4911 if you have any questions about our comments on Dr. Berman's report.

Very truly yours,

KENNEDY/JENKS CONSULTANTS

A handwritten signature in black ink, appearing to read "Bill Williams".

Bill Williams, Ph.D.
Risk Assessor

A handwritten signature in black ink, appearing to read "Gregg Bryden".

Gregg Bryden, CHMM
Project Scientist

Enclosure

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